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DOCKET NO. VTN568

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Zanini, et al.

Serial No.: 10/028,400 Art Unit: 1616

Filed : December 20, 2001 Examiner: CHOI, Frank

For : **SOFT CONTACT LENSES**

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March 1, 2004

(Date)

Kathy L. Willan

Name of applicant, assignee, or Registered Representative

Kathy L. Willan

(Signature)

March 1, 2004

(Date of Signature)

AUTHORIZATION TO CHARGE DEPOSIT ACCOUNT

Mail Stop Appeal
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Attached is an Appeal Brief for the above-captioned patent application.

Please charge Deposit Account No. 10-0750/VTN568/KAH in the name of Johnson & Johnson in the amount of $320.00, representing the cost of filing a Brief on Appeal in the above-captioned matter.

The Commissioner is hereby authorized to charge any additional fees which may be required to Account No. 10-0750/VTN568/KAH. This Authorization is being submitted in triplicate.

Respectfully submitted,

Karen A. Harding

Karen A. Harding
Attorney for Applicant(s)
Reg. No. 33967

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DATED: March 1, 2004

Docket No. VTN 568

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Zanini, *et al.*

Serial No.: 10/028,400 **Group Art Unit:** 1616

Filed: December 20, 2001 **Examiner:** CHOI, Frank

Title: SOFT CONTACT LENSES

ATTENTION: BOARD OF PATENT APPEALS AND INTERFERENCES

APPELLANTS' BRIEF (37 C.F.R. 1.192)

This is an appeal from the final rejection mailed August 28, 2003, a Notice of Appeal having been mailed on November 24, 2003.

The fees required under Section 1.17(f), and any required petition for extension of time for filing this brief and fees therefor, are addressed with in the accompanying TRANSMITTAL OF APPEAL BRIEF.

This brief is transmitted in triplicate. (37 CFR 1.192(a))

This brief contains these items under the following headings, and in the order set forth below (37 CFR 1.192(c)):

TABLE OF CONTENTS

1. REAL PARTY INTEREST

The real party in interest of the subject patent application is Johnson & Johnson Visioncare, Inc, having a principal place of business at 7500 Centurion Parkway, Suite 100, Jacksonville FL 32256.

2. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences pending.

3. STATUS OF CLAIMS

Claims 1-24 are pending. Claims 25 through 72 have been withdrawn. The claims were restricted to monomers of Formula I.

Claims 1,2, 4-9, 14-17 stand rejected as anticipated by JP 05-269181 under 35 U.S.C. 102(b).

Claims1-17 stand rejected as unpatentable under 35 U.S.C. 103 over JP 05-269181 in view of US 5,998,498 (Vanderlaan) and US 3,292,741 (Laskey).

Claims 18-24 are objected to as depending from a rejected claim.

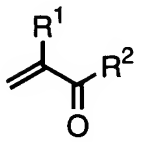
Claims 25 through 72, and monomers of Formulae II-IV were withdrawn from consideration.

4. STATUS OF AMENDMENTS

No amendments have been filed.

5. SUMMARY OF INVENTION

The present invention is related to antimicrobial lenses comprising silver and monomer of Formula I



wherein R^1 is hydrogen or C_{1-6}alkyl; and

R^2 is selected from specifically defined substituted ethers, amines, sulfides and alkyls [$-OR^3$, $-NH-R^3$, $-S-(CH_2)_d-R^3$, or $-(CH_2)_d-R^3$] (Claim 1). The monomers of Formula I reversibly bind silver (page 26, lines 13-18 and page 27, lines 6-10). More specifically, the present invention is based on the discovery that certain, specifically defined binding monomers may be covalently incorporated into a lens polymer, rendering the cured lens capable of reversibly binding silver. (Page 26, lines 13-15), and as a result, antimicrobial.

Furthermore, advantages of the lenses of the present invention include antimicrobial activity and clarity comparable to commercially available contact lenses (Page 27, lines 6-12). Antimicrobial is defined as "a lens that exhibit one or more of the following properties - the inhibition of the adhesion of bacteria or other microbes to the lenses, the inhibition of the growth of bacteria or other microbes on the lenses, and the killing of bacteria or other microbes on the surface of the lenses or in a radius extending from the lenses". Page 22, lines 8-12.

6. STATEMENT OF ISSUES

Whether claims 1,2, 4-9, 14-17 are anticipated by JP 05-269181 under 35 U.S.C. 102(b).

Whether claims1-17 are unpatentable under 35 U.S.C. 103 over JP 05-269181 in view of US 5,998,498 (Vanderlaan) and US 3,292,741 (Laskey).

7. GROUPING OF CLAIMS

For the purpose of the appeal, the following groups of claims do not stand or fall together.

7.1 Group I includes claims 1, 2, 4, 10-11 and 14-17 directed toward lenses comprising silver and a polymer comprising a monomer of formula I wherein R^2 is selected from specifically defined substituted ethers, amines, thios and alkyls.

7.2 Group II includes claims 5-9 and is directed toward lenses having specified amounts of the monomer of Formula I.

7.3 Group II includes claims 3, 12 and 13 directed toward antimicrobial lenses wherein R2 is selected from specified members of the -NH-R^3 group.

Groups I and II are separately patentable as Group II precludes use of monomers where R^2 is other than specifically defined amines. Therefore, the claims of Groups I and II are separately patentable from among themselves.

7.4 Group III includes claims 18-24, which relate to lenses where cystamine is the monomer.

8. ARGUMENTS

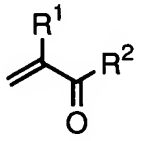
Claims 1,2, 4-9, 14-17 are not anticipated by JP 05-269181 under 35 U.S.C. 102(b).

"For a prior art reference to anticipate in terms of 35 U.S.C. 102, every element of the claimed invention must be identically shown in a single reference. . . . These elements must be arranged as in the claim under review." *In re Bond*, 910 F.2d 831, 832; 15 U.S.P.Q. 2d 1566, (Fed. Cir. 1990). Rejections under 35 U.S.C. 102 are proper only when the claimed subject matter is identically disclosed or described in the prior art. . . .In other words, to constitute an anticipation, all material elements recited in a claim must be found in one unit of prior art. *In re Marshall*, 198, USPQ 344, 578 F.2d 301, 304 (C.C.P.A. 1978) {citations omitted).

JP 05-269181 ("JP `181) discloses making resin moldings antimicrobial by incorporating certain antimicrobial complexes into or onto the resins. "

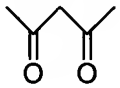
antimicrobial metal acetylacetonate complexes such as acetylacetonateometal complexes or benzoylacetonate complex salts such as benzoylacetonatometal complexes are soluble in many polymerizable monomers forming transparent plastics suitable for contact lenses, and can be strongly incorporated in polymer compositions. As a result of further study, we have also discovered that by adding a radical-polymerizable unsaturated double-bond-containing function group to the benzene ring of the benzoylacetonatometal complex, the antimicrobial material can be directly incorporated into the polymer chain." JP `181, page 7, paragraphs 11 and 12.

JP `181 does not disclose every element recited in claim 1. Claim 1 recites an antimicrobial lens comprising silver and a polymer comprising a monomer from a specifically defined formula. Neither acetylacetonate nor benzyolacetonates are recited in claim 1. Specifically, claim 1 recites "an antimicrobial lens comprising silver and a polymer comprising a monomer of Formula I

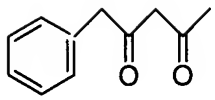


wherein R^1 is hydrogen or C_{1-6}alkyl; and R^2 is selected from (in relevant part) $-OR^3$, or $-(CH_2)_d-R^3$. For claim 1 to be anticipated by JP `181 acetylacetonate and/or benzyoyacetonate would need to be included as one of the possible structures within Formula 1. This is not the case.

Acetylacetonate has the following structure:



Benzoylacetonate has the following structure:



Neither acetylacetonate nor benzoylacetonate has an acryl group in the position required in claim 1. Appellants could not find in JP `181 any reference to acryl acetonate, only acetyl acetonate (page 7, paragraph 11, page 20, third line from top). Further the definitions of the substituents for $R^3$ do not include ketones, such as 2-propanone or 3-benzyl-2-propanone. (See claim 1, lines 14-23). Accordingly, JP `181 does not disclose a monomer of Formula I, as recited in claim. The rejection of the claims based upon 35 U.S.C. 102 in view of JP `181 should be withdrawn.

Claims 1-17 are patentable under 35 U.S.C. 103 over JP 05-269181 in view of US 5,998,498 (Vanderlaan) and US 3,929,741 (Laskey).

Claim 1 of the present invention recites an antimicrobial lens comprising silver and a polymer formed from monomers of Formula I. The references simply do not suggest these recited elements.

JP `181 discloses acetonate metal complexes which may be incorporated into contact lenses and lens cases to make them antimicrobial. (See page 3, claim 10 and page 7, paragraphs 11 and 12). No other monomers capable of binding silver are disclosed.

Vanderlaan discloses soft contact lenses formed from silicone hydrogels comprising specific monoalkyl terminated siloxane monomers (Column 2, lines 24-43). The use of any antimicrobial agents or binding monomers, let alone those of the present invention is not disclosed.

Laskey discloses polymer compositions comprising a hydrophilic polymer obtained by polymerization of an acrylamido alkyl sulfonic acid monomer which have the ability to ingurgitate water "in extremely high quantities, even up to 400 times the weight of the polymer." See column 1, lines 31 through 36. "[C]omonomers can be used to alter the physical properties

of the polymer and the amount of aqueous liquid which can be ingurgitated by the polymer. The amount of such co-monomer may be up to 50% of the total, though generally smaller amounts may be used." (Column 4, lines 29-33). Laskey is also silent with respect to the incorporation of antimicrobial agents of any kind.

As will become apparent from the ensuing detailed arguments, the Examiner has arrived at Appellants' invention by ignoring the conflicting teachings of the art and selectively choosing elements in the references to arrive at Appellants' invention.

The Examiner stated:

> The difference between the prior art and the claimed invention is that the prior art does not expressly disclose an antimicrobial contact lens comprising silver and a polymer comprising a monomer of formula I in which R3 being substitute phenyl, the claimed organic sulfonic acid, organic phosphoric acid or organic disulfide, or the lens is etafilcon A, balafilcon A, acquafilcon A, lenefilcon, lotrafilcon or silcone hdyrogel. However, the prior art amply suggests the same as antimicrobial soft contact lenses containing silver and monomers falling with the scope of formula I are known in the art. As such, it would have been well within the skill of and one of ordinary skill in the art would have been motivated to modify the prior art as above with the expectation the soft contact lenses produced would have antimicrobial properties." Page 5, third full paragraph, paper number 7.

Table 1 compares the elements of claim 1, with the cited references.

Table 1

	Antimicrobial lens	Silver	Monomer of Formula I
JP `181	Yes	Yes	No
Vanderlaan	No	No	No
Laskey	No	No	Yes

As discussed above, JP `181 discloses acetonate metal complexes. Many other antimicrobial agents are suggested by JP `181 (chitosans, paragraphs 13-14; chlorhexidine, paragraphs 15-17, ethacridine, paragraphs 18-20 and quaternary ammonium salts, paragraphs 21-23). However, none of these other antimicrobial agents have the structure recited in Formula I or claim 1. Neither does JP `181 suggest their use with silver. To the extent that JP `181 suggests alternatives for acetonate metal complexes, it suggests organic, non-metal containing antimicrobials.

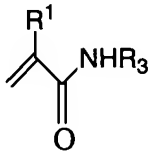
Laskey discloses monomers useful for making polymers which are capable of ingurgitating water "in extremely high quantities, even up to 400 times the weight of the polymer." See column 1, lines 31 through 36. There is nothing in Laskey to suggest that (a) the acrylamido alkyl sulphonic acid monomers could be used for any purpose, other than the ingurgitation of water; (b) silver should be incorporated into the polymers formed from the monomers disclosed therein, or (c) the resulting articles would be antimicrobial. Vanderlaan teaches monomer compositions useful for making contact lenses. Neither silver nor monomers of Formula I are disclosed or suggested. None of the references suggest the interchangeability of the monomers disclosed therein with any other monomer.

The only logical conclusion is that the Examiner reconstructed Appellants' invention through hindsight reconstruction. It is well settled that hindsight reconstruction is an impermissible means to render claims obvious.

When prior art reference require selective combination by the court to render obvious a subsequent invention, there must be some reason for the combination other than the hindsight gleaned from the invention itself." *Uniroyal Inc. v. Rudkin-Wiley Corp.*, 5 U.S.P.Q. 2d 1434 (Fed. Cir. 1988). See also, *In re Fine*, 837, F.2d 1071, 1075; 5 U.S.P.Q. 2d 1596 (Fed. Cir. 1988) "One cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to depreciate the claimed invention."

Accordingly, Applicants respectfully submit that the Examiner has not established a *prima facie* case of obviousness with respect to the claims of group I. Reversal of the rejection is respectfully requested.

With respect to Group III Appellants further note that claims 5 through 9 specify amounts of binding monomer (about 0.01 to about 1.5, 0.01 to about 0.8, 0.01 to about 0.3; 0.01 to about 0.2 and 0.01 to about 0.09 weight percent) which are far lower than those required by Laskey (comonomers may be present only up to about 50 weight%). With respect to Group II (claims 3, 12 and 13), JP `181 neither discloses nor suggests monomers of the formula



and as discussed above, there is nothing in either JP `181 or Laskey which would suggest that the compounds of Laskey were structurally similar to those in JP `181.

"There mere fact that it is *possible* to find two isolated disclosures which might be combined in such a way to produce a new compound does not necessarily render such production obvious unless the art also contains something to suggest the desirability of the proposed combination. [emphasis in original]." *In re Grabniak*, 769 F.2d 729; 732; 226 U.S.P.Q. 870 (Fed. Cir. 1985). Accordingly, Applicants respectfully submit that the Examiner has not established a *prima facie* case of obviousness with respect to the claims of group II. Reversal of the rejection is respectfully requested.

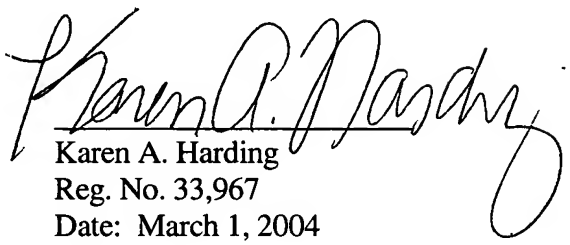
8.5 CONCLUSION

For the foregoing reasons, the reversal of the rejections relating to claims 1 through 17 are respectfully requested.

9. APPENDIX OF CLAIMS INVOLVED IN THE APPEAL

(See attached)

Respectfully submitted,



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Reg. No. 33,967
Date: March 1, 2004

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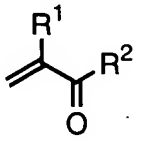
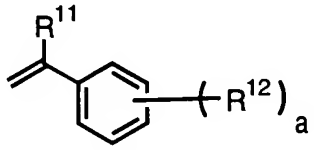
(904)-443-3074

APPENDIX OF CLAIMS INVOLVED IN THE APPEAL

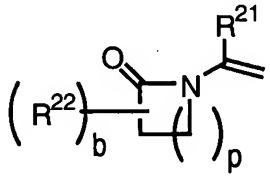
1. An antimicrobial lens comprising silver and a polymer comprising a monomer of Formula I, II, III or IV



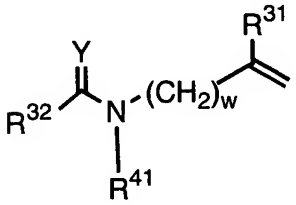
I



II



III



IV

wherein

R^1 is hydrogen or C_{1-6}alkyl;

R^2 is $-OR^3$, $-NH-R^3$, $-S-(CH_2)_d-R^3$, or $-(CH_2)_d-R^3$, wherein

d is 0-8;

R^3 is substituted C_{1-6}alkyl

where the alkyl substituents are selected from one or more members of the group consisting of carboxylic acid, sulfonic acid, phosphonic acid, amine, amidine, acetamide, nitrile, thiol, C_{1-6}alkyldisulfide, C_{1-6}alkylsulfide, phenyldisulfide, urea, C_{1-6}alkylurea, phenylurea, thiourea, C_{1-6}alkylthiourea, phenylthiourea, substituted C_{1-6}alkyldisulfide, substituted phenyldisulfide, substituted C_{1-6}alkylurea, substituted

phenylurea, substituted C_{1-6}alkylthiourea, and substituted phenylthiourea

wherein the C_{1-6}alkyldisulfide, phenyldisulfide, C_{1-6}alkylurea, C_{1-6}alkylthiourea, phenylurea, and

phenylthiourea substituents are selected from the group consisting of C_{1-6}alkyl, haloC_{1-6}alkyl, halogen, hydroxyl, carboxylic acid, sulfonic acid, phosphonic acid, amine, amidine, acetamide, and nitrile;

$-(CR^4R^5)_q-(CHR^6)_m-SO_3H$

wherein R^4, R^5, and R^6 are independently selected from the group consisting of hydrogen, halogen, hydroxyl, and C_{1-6}alkyl,

q is 1-6, and

m is 0-6;

$-(CH_2)_n-S-S-(CH_2)_xNH-C(O)CR^7CH_2$,

wherein R^7 is hydrogen or C_{1-6}alkyl,

n is 1-6, and

x is 1-6;

$-(CR^8R^9)_t-(CHR^{10})_u-P(O)(OH)_2$

wherein R^8, R^9, and R^{10} are independently selected from the group consisting of hydrogen, halogen, hydroxyl, and C_{1-6}alkyl,

t is 1-6, and

u is 0-6;

phenyl;

benzyl;

pyridinyl;

pyrimidinyl;

pyrazinyl;

benzimidazolyl;

benzothiazolyl;

benzotriazolyl;

naphthaloyl;

quinolinyl;
indolyl;
thiadiazolyl;
triazolyl;
4-methylpiperidin-1-yl;
4-methylpiperazin-1-yl;
substituted phenyl;
substituted benzyl;
substituted pyridinyl;
substituted pyrimidinyl;
substituted pyrazinyl;
substituted benzimidazolyl;
substituted benzothiazolyl;
substituted benzotriazolyl;
substituted naphthaloyl;
substituted quinolinyl;
substituted indolyl;
substituted thiadiazolyl;
substituted triazolyl;
substituted 4-methylpiperidin-1-yl; or
substituted 4-methylpiperazin-1-yl,

wherein the substituents are selected from one or more members of the group consisting of C_{1-6}alkyl, haloC_{1-6}alkyl, halogen, sulfonic acid, phosphonic acid, hydroxyl, carboxylic acid, amine, amidine, N-(2-aminopyrimidine)sulfonyl, N-(aminopyridine)sulfonyl, N-(aminopyrazine)sulfonyl,

N-(2-aminopyrimidine)carbonyl, N-(aminopyridine)carbonyl, N-(aminopyrazine)carbonyl, N-(2-aminopyrimidine)phosphonyl, N-(2-aminopyridine)phosphonyl, N-(aminopyrazine)phosphonyl, N-(aminobenzimidazolyl)sulfonyl, N-(aminobenzothiazolyl)sulfonyl, N-(aminobenzotriazolyl)sulfonyl, N-(aminoindolyl)sulfonyl, N-(aminothiazolyl)sulfonyl, N-(aminotriazolyl)sulfonyl, N-(amino-4-methylpiperidinyl)sulfonyl, N-(amino-4-methylpiperazinyl)sulfonyl, N-(aminobenzimidazolyl)carbonyl, N-(aminobenzothiazolyl)carbonyl, N-(aminobenzotriazolyl)carbonyl, N-(aminoindolyl)carbonyl, N-(aminothiazolyl)carbonyl, N-(aminotriazolyl)carbonyl, N-(amino-4-methylpiperidinyl)carbonyl, N-(amino-4-methylpiperazinyl)carbonyl, N-(2-aminobenzimidazolyl)phosphonyl, N-(2-aminobenzothiazolyl)phosphonyl, N-(2-aminobenzotriazolyl)phosphonyl, N-(2-aminoindolyl)phosphonyl, N-(2-aminothiazolyl)phosphonyl, N-(2-aminotriazolyl)phosphonyl, N-(amino-4-methylpiperidinyl) phosphonyl, N-(amino-4-methylpiperazinyl) phosphonyl, acetamide, nitrile, thiol, C_{1-6}alkyldisulfide, C_{1-6}alkylsulfide, phenyl disulfide, urea, C_{1-6}alkylurea, phenylurea, thiourea, C_{1-6}alkylthiourea, phenylthiourea, substituted C_{1-6}alkyldisulfide, substituted phenyldisulfide, substituted C_{1-6}alkylurea, substituted

C_{1-6}alkylthiourea, substituted phenylurea, and substituted phenylthiourea

wherein the C_{1-6}alkyldisulfide, phenyldisulfide, C_{1-6}alkylurea, C_{1-6}alkylthiourea, phenylurea, and phenylthiourea substituents are selected from the group consisting of C_{1-6}alkyl, haloC_{1-6}alkyl, halogen, hydroxyl, carboxylic acid, sulfonic acid, phosphonic acid, amine, amidine, acetamide, and nitrile;

a is 1-5;

R^{11} is hydrogen or C_{1-6}alkyl;

R^{12} is hydroxyl, sulfonic acid, phosphonic acid, carboxylic acid, acetamide, thioC_{1-6}alkylcarbonyl, C_{1-6}alkyldisulfide, C_{1-6}alkylsulfide, phenyl disulfide, urea, C_{1-6}alkylurea, phenylurea, thiourea, C_{1-6}alkylthiourea, phenylthiourea, $-OR^{13}$, $-NH-R^{13}$, $-S-(CH_2)_d-R^{13}$, $-(CH_2)_d-R^{13}$, $-C(O)NH--(CH_2)_d-R^{13}$, $-C(O)-(CH_2)_d-R^{13}$, substituted C_{1-6}alkyldisulfide, substituted phenyldisulfide, substituted C_{1-6}alkylurea, substituted phenylurea, substituted phenylthiourea or substituted C_{1-6}alkylthiourea wherein the substituents are selected from the group consisting of C_{1-6}alkyl, haloC_{1-6}alkyl, halogen, hydroxyl, carboxylic acid, sulfonic acid, phosphonic acid, amine, amidine, acetamide, and nitrile;

where

d is 0-8;

R^{13} is thioC_{1-6}alkylcarbonyl;

substituted C_{1-6}alkyl

where the alkyl substituents are selected from one or more members of the group consisting of hydroxyl, carboxylic acid, sulfonic acid, phosphonic acid, amine, amidine, acetamide, nitrile, thiol, C_{1-6}alkyldisulfide, C_{1-6}alkylsulfide, phenyldisulfide,

urea, C_{1-6}alkylurea, phenylurea, thiourea, C_{1-6}alkylthiourea, phenylthiourea, substituted C_{1-6}alkyldisulfide, substituted phenyldisulfide, substituted C_{1-6}alkylurea, substituted phenylurea, substituted C_{1-6}alkylthiourea and substituted phenylthiourea

wherein the C_{1-6}alkyldisulfide, phenyldisulfide, C_{1-6}alkylurea, C_{1-6}alkylthiourea, phenylurea, and phenylthiourea substituents are selected from the group consisting of C_{1-6}alkyl, haloC_{1-6}alkyl, halogen, hydroxyl, carboxylic acid, sulfonic acid, phosphonic acid, amine, amidine, acetamide, and nitrile;

$-(CR^{14}R^{15})_q-(CHR^{16})_m-SO_3H$

where R^{14}, R^{15}, and R^{16} are independently selected from the group consisting of hydrogen, halogen, hydroxyl, and C_{1-6}alkyl,

q is 1-6, and

m is 0-6;

$-(CH_2)_n-S-S-(CH_2)_xNH-C(O)CR^{17}CH_2$,

where R^{17} is hydrogen or C_{1-6}alkyl,

n is 1-6, and

x is 1-6;

$-(CR^{18}\ R^{19})_t-(CHR^{20})_u-P(O)(OH)_2$

where R^{18}, R^{19}, and R^{20} are independently selected from the group consisting of hydrogen, halogen, hydroxyl, and C_{1-6}alkyl,

t is 1-6, and

u is 0-6;

phenyl;

benzyl;

pyridinyl;
pyrimidinyl;
pyrazinyl;
benzimidazolyl;
benzothiazolyl;
benzotriazolyl;
naphthaloyl;
quinolinyl;
indolyl;
thiadiazolyl;
triazolyl;
4-methylpiperidin-1-yl;
4-methylpiperazin-1-yl;
substituted phenyl;
substituted benzyl;
substituted pyridinyl;
substituted pyrimidinyl;
substituted pyrazinyl;
substituted benzimidazolyl;
substituted benzothiazolyl;
substituted benzotriazolyl;
substituted naphthaloyl;
substituted quinolinyl;
substituted indolyl;
substituted thiadiazolyl;
substituted triazolyl;
substituted 4-methylpiperidin-1-yl; or

substituted 4-methylpiperazin-1-yl

wherein the substituents are selected from one or more members of the group consisting of C_{1-6}alkyl, haloC_{1-6}alkyl, halogen, sulfonic acid, phosphonic acid, hydroxyl, carboxylic acid, amine, amidine, N-(2-aminopyrimidine)sulfonyl, N-(aminopyridine)sulfonyl, N-(aminopyrazine)sulfonyl, N-(2-aminopyrimidine)carbonyl, N-(aminopyridine)carbonyl, N-(aminopyrazine)carbonyl, N-(2-aminopyrimidine)phosphonyl, N-(2-aminopyridine)phosphonyl, N-(aminopyrazine)phosphonyl, N-(aminobenzimidazolyl)sulfonyl, N-(aminobenzothiazolyl)sulfonyl, N-(aminobenzotriazolyl)sulfonyl, N-(aminoindolyl)sulfonyl, N-(aminothiazolyl)sulfonyl, N-(aminotriazolyl)sulfonyl, N-(amino-4-methylpiperidinyl)sulfonyl, N-(amino-4-methylpiperazinyl)sulfonyl, N-(aminobenzimidazolyl)carbonyl, N-(aminobenzothiazolyl)carbonyl, N-(aminobenzotriazolyl)carbonyl, N-(aminoindolyl)carbonyl, N-(aminothiazolyl)carbonyl, N-(aminotriazolyl)carbonyl, N-(amino-4-methylpiperidinyl)carbonyl, N-(amino-4-methylpiperazinyl)carbonyl, N-(2-aminobenzimidazolyl)phosphonyl, N-(2-aminobenzothiazolyl)phosphonyl, N-(2-aminobenzotriazolyl)phosphonyl, N-(2-aminoindolyl)phosphonyl, N-(2-aminothiazolyl)phosphonyl,

N-(2-aminotriazolyl)phosphonyl, N-(amino-4-methylpiperidinyl) phosphonyl, N-(amino-4-methylpiperazinyl) phosphonyl, acetamide, nitrile, thiol, C_{1-6}alkyldisulfide, C_{1-6}alkylsulfide, phenyl disulfide, urea, C_{1-6}alkylurea, phenylurea, thiourea, C_{1-6}alkylthiourea, phenylthiourea, substituted C_{1-6}alkyldisulfide, substituted phenyldisulfide, substituted C_{1-6}alkylurea, substituted C_{1-6}alkylthiourea, substituted phenylurea, and substituted phenylthiourea

wherein the C_{1-6}alkyldisulfide, phenyldisulfide, C_{1-6}alkylurea, C_{1-6}alkylthiourea, phenylurea, and phenylthiourea substituents are selected from the group consisting of C_{1-6}alkyl, haloC_{1-6}alkyl, halogen, hydroxyl, carboxylic acid, sulfonic acid, phosphonic acid, amine, amidine, acetamide, and nitrile;

b is 1-5;

p is 1-5;

R^{21} is hydrogen;

R^{22} is hydroxyl, sulfonic acid, phosphonic acid, carboxylic acid, thioC_{1-6}alkylcarbonyl, thioC_{1-6}alkylaminocarbonyl, C_{1-6}alkyldisulfide, phenyldisulfide, $-C(O)NH(CH_2)_{1-6}-SO_3H$, $-C(O)NH(CH_2)_{1-6}-P(O)(OH)_2$, $-OR^{23}$, $-NH-R^{23}$, $-C(O)NH-(CH_2)_d-R^{23}$, $-S-(CH_2)_d-R^{23}$, $-(CH_2)_d-R^{23}$, urea, C_{1-6}alkylurea, phenylurea, thiourea, C_{1-6}alkylthiourea, phenylthiourea, substituted C_{1-6}alkyldisulfide, substituted phenyldisulfide, substituted C_{1-6}alkylurea, substituted, C_{1-6}alkylthiourea substituted phenylurea or substituted phenylthiourea wherein the substituents are selected from the group consisting of C_{1-6}alkyl, haloC_{1-6}alkyl, halogen, hydroxyl, carboxylic acid, sulfonic acid, phosphonic acid, amine, amidine, acetamide, and nitrile,

where

d is 0-8;

R^{23} is thioC_{1-6}alkylcarbonyl,

C_{1-6}alkyl,

substituted C_{1-6}alkyl

where the alkyl substituents are selected from one or more members of the group consisting of C_{1-6}alkyl, halo C_{1-6}alkyl, halogen, hydroxyl, carboxylic acid, sulfonic acid, phosphonic acid, amine, amidine, acetamide, nitrile, thiol, C_{1-6}alkyldisulfide, C_{1-6}alkylsulfide, phenyldisulfide, urea, C_{1-6}alkylurea, phenylurea, thiourea, C_{1-6}alkylthiourea, phenylthiourea, substituted C_{1-6}alkyldisulfide, substituted phenyldisulfide, substituted C_{1-6}alkylurea, substituted phenylurea, substituted C_{1-6}alkylthiourea, and substituted phenylthiourea

wherein the C_{1-6}alkyldisulfide, phenyldisulfide, C_{1-6}alkylurea, C_{1-6}alkylthiourea, phenylurea, and phenylthiourea substituents are selected from the group consisting of C_{1-6}alkyl, haloC_{1-6}alkyl, halogen, hydroxyl, carboxylic acid, sulfonic acid, phosphonic acid, amine, amidine, acetamide, and nitrile;

$-(CR^{24}\ R^{25})_q-(CHR^{26})_m-SO_3H$

where R^{24}, R^{25}, and R^{26} are independently selected from the group consisting of hydrogen, halogen, hydroxyl, and C_{1-6}alkyl,

q is 1-6, and

m is 0-6

$-(CH_2)_n-S-S-(CH_2)_xNH-C(O)CR^{27}CH_2$,

where R^{27} is hydrogen or C_{1-6}alkyl,

n is 1-6, and

x is 1-6;

$-(CR^{28}\ R^{29})_t-(CHR^{30})_u-P(O)(OH)_2$

where R^{28}, R^{29}, and R^{30} are independently selected from the group consisting of hydrogen, halogen, hydroxyl, and C_{1-6}alkyl,

t is 1-6, and

u is 0-6;

phenyl;

benzyl;

pyridinyl;

pyrimidinyl;

pyrazinyl;

benzimidazolyl;

benzothiazolyl;

benzotriazolyl;

naphthaloyl;

quinolinyl;

indolyl;

thiadiazolyl;

triazolyl;

4-methylpiperidin-1-yl;

4-methylpiperazin-1-yl;

substituted phenyl;

substituted benzyl;

substituted pyridinyl;

substituted pyrimidinyl;

substituted pyrazinyl;

substituted benzimidazolyl;

substituted benzothiazolyl;

substituted benzotriazolyl;

substituted naphthaloyl;

substituted quinolinyl;

substituted indolyl;

substituted thiadiazolyl;

substituted triazolyl;

substituted 4-methylpiperidin-1-yl; or

substituted 4-methylpiperazin-1-yl,

wherein the substituents are selected from one or more members of the group consisting of C_{1-6}alkyl, haloC_{1-6}alkyl, halogen, sulfonic acid, phosphonic acid, hydroxyl, carboxylic acid, amine, amidine, N-(2-aminopyrimidine)sulfonyl, N-(aminopyridine)sulfonyl, N-(aminopyrazine)sulfonyl, N-(2-aminopyrimidine)carbonyl, N-(aminopyridine)carbonyl, N-(aminopyrazine)carbonyl, N-(2-aminopyrimidine)phosphonyl, N-(2-aminopyridine)phosphonyl, N-(aminopyrazine)phosphonyl, N-(aminobenzimidazolyl)sulfonyl, N-(aminobenzothiazolyl)sulfonyl, N-(aminobenzotriazolyl)sulfonyl, N-(aminoindolyl)sulfonyl, N-(aminothiazolyl)sulfonyl, N-(aminotriazolyl)sulfonyl, N-(amino-4-methylpiperidinyl)sulfonyl, N-(amino-4-methylpiperazinyl)sulfonyl, N-(aminobenzimidazolyl)carbonyl, N-(aminobenzothiazolyl)carbonyl,

N-(aminobenzotriazolyl)carbonyl, N-(aminoindolyl)carbonyl, N-(aminothiazolyl)carbonyl, N-(aminotriazolyl)carbonyl, N-(amino-4-methylpiperidinyl)carbonyl, N-(amino-4-methylpiperazinyl)carbonyl, N-(2-aminobenzimidazolyl)phosphonyl, N-(2-aminobenzothiazolyl)phosphonyl, N-(2-aminobenzotriazolyl)phosphonyl, N-(2-aminoindolyl)phosphonyl, N-(2-aminothiazolyl)phosphonyl, N-(2-aminotriazolyl)phosphonyl, N-(amino-4-methylpiperidinyl) phosphonyl, N-(amino-4-methylpiperazinyl) phosphonyl, acetamide, nitrile, thiol, C_{1-6}alkyldisulfide, C_{1-6}alkylsulfide, phenyl disulfide, urea, C_{1-6}alkylurea, phenylurea, thiourea, C_{1-6}alkylthiourea, phenylthiourea, substituted C_{1-6}alkyldisulfide, substituted phenyldisulfide, substituted C_{1-6}alkylurea, substituted C_{1-6}alkylthiourea, substituted phenylurea, and substituted phenylthiourea

wherein the C_{1-6}alkyldisulfide, phenyldisulfide, C_{1-6}alkylurea, C_{1-6}alkylthiourea, phenylurea, and phenylthiourea substituents are selected from the group consisting of C_{1-6}alkyl, haloC_{1-6}alkyl, halogen, hydroxyl, carboxylic acid, sulfonic acid, phosphonic acid, amine, amidine, acetamide, and nitrile;

w is 0-1;

Y is oxygen or sulfur;

R^{31} is hydrogen or C_{1-6}alkyl;

R^{32} is hydroxyl, sulfonic acid, phosphonic acid, carboxylic acid, thioC_{1-6}alkylcarbonyl, thioC_{1-6}alkylaminocarbonyl, -C(O)NH-$(CH_2)_d$-R^{33}, -O-R^{33}, -NH-R^{33}, -S-$(CH_2)_d$-R^{33}, -$(CH_2)_d$-R^{33}, C_{1-6}alkyldisulfide, phenyldisulfide, urea, C_{1-6}alkylurea, phenylurea, thiourea, C_{1-6}alkylthiourea, phenylthiourea, C_{1-6}alkylamine, phenylamine, substituted C_{1-6}alkyldisulfide, substituted phenyldisulfide, substituted phenylurea, substituted C_{1-6}alkylamine, substituted phenylamine, substituted phenylthiourea, substituted C_{1-6}alkylurea or substituted C_{1-6}alkylthiourea wherein the substitutents are selected from the group consisting of C_{1-6}alkyl, haloC_{1-6}alkyl, halogen, hydroxyl, carboxylic acid, sulfonic acid, phosphonic acid, amine, amidine, acetamide, and nitrile

where

d is 0-8;

R^{33} is thioC_{1-6}alkylcarbonyl,

C_{1-6}alkyl,

substituted C_{1-6}alkyl

where the alkyl substituents are selected from one or more members of the group consisting of C_{1-6}alkyl, halo C_{1-6}alkyl, halogen, hydroxyl, carboxylic acid, sulfonic acid, phosphonic acid, amine, amidine, acetamide, nitrile, thiol, C_{1-6}alkyldisulfide, C_{1-6}alkylsulfide, phenyldisulfide, urea, C_{1-6}alkylurea, phenylurea, thiourea, C_{1-6}alkylthiourea, phenylthiourea, substituted C_{1-6}alkyldisulfide, substituted phenyldisulfide, substituted C_{1-6}alkylurea, substituted phenylurea, substituted C_{1-6}alkylthiourea or substituted phenylthiourea

wherein the C_{1-6}alkyldisulfide, phenyldisulfide, C_{1-6}alkylurea, C_{1-6}alkylthiourea, phenylurea, and

phenylthiourea substituents are selected from the group consisting of C_{1-6}alkyl, haloC_{1-6}alkyl, halogen, hydroxyl, carboxylic acid, sulfonic acid, phosphonic acid, amine, amidine, acetamide, and nitrile;

$-(CR^{34}R^{35})_q-(CHR^{36})_m-SO_3H$

where R^{34}, R^{35}, and R^{36} are independently selected from the group consisting of hydrogen, halogen, hydroxyl, and C_{1-6}alkyl,

q is 1-6, and

m is 0-6;

$-(CH_2)_n-S-S-(CH_2)_xNH-C(O)CR^{37}CH_2$,

where R^{37} is hydrogen or C_{1-6}alkyl,

n is 1-6, and

x is 1-6;

$-(CR^{38}R^{39})_t-(CHR^{40})_u-P(O)(OH)_2$

where R^{38}, $R3^9$, and R^{40} are independently selected from the group consisting of hydrogen, halogen, hydroxyl, and C_{1-6}alkyl,

t is 1-6, and

u is 0-6;

phenyl;

benzyl;

pyridinyl;

pyrimidinyl;

pyrazinyl;

benzimidazolyl;

benzothiazolyl;

benzotriazolyl;

naphthaloyl;

quinolinyl;
indolyl;
thiadiazolyl;
triazolyl;
4-methylpiperidin-1-yl;
4-methylpiperazin-1-yl;
substituted phenyl;
substituted benzyl;
substituted pyridinyl;
substituted pyrimidinyl;
substituted pyrazinyl;
substituted benzimidazolyl;
substituted benzothiazolyl;
substituted benzotriazolyl;
substituted naphthaloyl;
substituted quinolinyl;
substituted indolyl;
substituted thiadiazolyl;
substituted triazolyl;
substituted 4-methylpiperidin-1-yl; or
substituted 4-methylpiperazin-1-yl,

wherein the substituents are selected from one or more members of the group consisting of C_{1-6}alkyl, haloC_{1-6}alkyl, halogen, sulfonic acid, phosphonic acid, hydroxyl, carboxylic acid, amine, amidine, N-(2-aminopyrimidine)sulfonyl, N-(aminopyridine)sulfonyl, N-(aminopyrazine)sulfonyl,

N-(2-aminopyrimidine)carbonyl, N-(aminopyridine)carbonyl, N-(aminopyrazine)carbonyl, N-(2-aminopyrimidine)phosphonyl, N-(2-aminopyridine)phosphonyl, N-(aminopyrazine)phosphonyl, N-(aminobenzimidazolyl)sulfonyl, N-(aminobenzothiazolyl)sulfonyl, N-(aminobenzotriazolyl)sulfonyl, N-(aminoindolyl)sulfonyl, N-(aminothiazolyl)sulfonyl, N-(aminotriazolyl)sulfonyl, N-(amino-4-methylpiperidinyl)sulfonyl, N-(amino-4-methylpiperazinyl)sulfonyl, N-(aminobenzimidazolyl)carbonyl, N-(aminobenzothiazolyl)carbonyl, N-(aminobenzotriazolyl)carbonyl, N-(aminoindolyl)carbonyl, N-(aminothiazolyl)carbonyl, N-(aminotriazolyl)carbonyl, N-(amino-4-methylpiperidinyl)carbonyl, N-(amino-4-methylpiperazinyl)carbonyl, N-(2-aminobenzimidazolyl)phosphonyl, N-(2-aminobenzothiazolyl)phosphonyl, N-(2-aminobenzotriazolyl)phosphonyl, N-(2-aminoindolyl)phosphonyl, N-(2-aminothiazolyl)phosphonyl, N-(2-aminotriazolyl)phosphonyl, N-(amino-4-methylpiperidinyl) phosphonyl, N-(amino-4-methylpiperazinyl) phosphonyl, acetamide, nitrile, thiol, C_{1-6}alkyldisulfide, C_{1-6}alkylsulfide, phenyl disulfide, urea, C_{1-6}alkylurea, phenylurea, thiourea, C_{1-6}alkylthiourea, phenylthiourea, substituted C_{1-6}alkyldisulfide, substituted phenyldisulfide, substituted C_{1-6}alkylurea, substituted

C_{1-6}alkylthiourea, substituted phenylurea, and substituted phenylthiourea

wherein the C_{1-6}alkyldisulfide, phenyldisulfide, C_{1-6}alkylurea, C_{1-6}alkylthiourea, phenylurea, and phenylthiourea substituents are selected from the group consisting of C_{1-6}alkyl, haloC_{1-6}alkyl, halogen, hydroxyl, carboxylic acid, sulfonic acid, phosphonic acid, amine, amidine, acetamide, and nitrile;

R^{41} is hydrogen, C_{1-6}alkyl, phenyl, C_{1-6}alkylcarbonyl, phenylcarbonyl, substituted C_{1-6}alkyl, substituted phenyl, substituted C_{1-6}alkylcarbonyl or substituted phenylcarbonyl,

wherein

the substituents are selected from the group consisting of C_{1-6}alkyl, haloC_{1-6}alkyl, halogen, hydroxyl, carboxylic acid, sulfonic acid, phosphonic acid, amine, amidine, acetamide, and nitrile.

2. The antimicrobial lens of claim 1 comprising a polymer comprising a monomer of Formula I.

3. The antimicrobial lens of claim 2 wherein,

R^1 is hydrogen or C_{1-3}alkyl;

R^2 is NH-R^3;

d is 0

R^3 is substituted phenyl, $-(CR^4\ R^5)_q-(CHR^6)_m-SO_3H$, $-(CR^8R^9)_t-(CHR^{10})_u-P(O)(OH)_2$ or $-(CH_2)_n-S-S-(CH_2)_xNH-C(O)CR^7CH_2$;

R^4 is hydrogen or C_{1-3}alkyl;

R^5 is hydrogen or C_{1-3}alkyl;

R^6 is hydrogen or C_{1-3}alkyl;

q is 1-3;

m is 1-3;

R^7 is hydrogen or C_{1-3}alkyl;

R^8 is hydrogen or C_{1-3}alkyl;

R^9 is hydrogen or C_{1-3}alkyl;

R^{10} is hydrogen or C_{1-3}alkyl;
t is 1-3;

u is 1-3;

n is 2-4; and

x is 2-4.

4. The antimicrobial lens of claim 2 wherein the lens is a soft contact lens.

5. The antimicrobial lens of claim 2 wherein the monomer of Formula I is present at about 0.01 to about 1.5 weight percent.

6. The antimicrobial lens of claim 2 wherein the monomer of Formula I is present at about 0.01 to about 0.8 weight percent.

7. The antimicrobial lens of claim 2 wherein the monomer of Formula I is present at about 0.01 to about 0.3 weight percent.

8. The antimicrobial lens of claim 2 wherein the monomer of Formula I is present at about 0.01 to about 0.2 weight percent.

9. The antimicrobial lens of claim 2 wherein the monomer of Formula I is present at about 0.01 to about 0.09 weight percent.

10. The antimicrobial lens of claim 2 wherein the lens is a silicone hydrogel.

11. The antimicrobial lens of claim 2 wherein, the lens is etafilcon A, balafilcon, A, acquafilcon A, lenefilcon A, or lotrafilcon A.

12. The antimicrobial lens of claim 2 wherein,

R^1 is hydrogen or methyl;

R^2 is NH-R^3;

R^3 is $-(CR^4\ R^5)_q-(CHR^6)_m-SO_3H$, $-(CR^8R^9)_t-(CHR^{10})_u-P(O)(OH)_2$ or $-(CH_2)_n-S-S-(CH_2)_xNH-C(O)CHR^7CH_2$;

R^4 is hydrogen or methyl;

R^5 is hydrogen or methyl;

q is 1-2;

m is 1-2;

R^6 is hydrogen or methyl;

R^7 is hydrogen;

R^8 is hydrogen or methyl;

R^9 is hydrogen or methyl;

R^{10} is hydrogen or methyl;

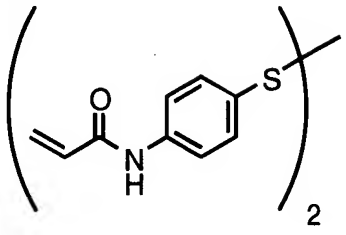
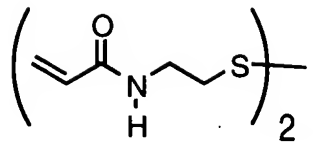
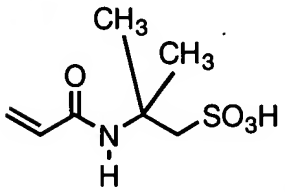
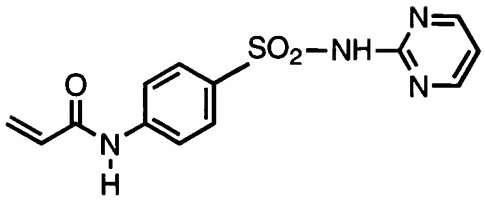
t is 1;

u is 1-2;

n is 2-3; and

x is 2-3.

13. The antimicrobial lens of claim 2 wherein the monomer of Formula I is selected from the group consisting of




and


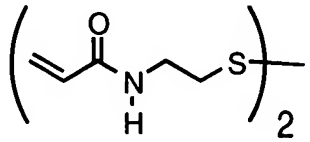
14. The antimicrobial lens of claim 2 wherein silver is present at about 20 ppm to about 1,200 ppm.

15. The antimicrobial lens of claim 2 wherein silver is present at about 20 ppm to about 600 ppm.

16. The antimicrobial lens of claim 2 wherein silver is present at about 20 ppm to about 150 ppm.

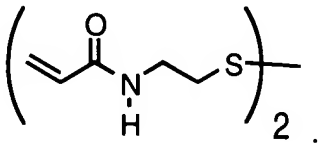
17. The antimicrobial lens of claim 2 wherein silver is present at about 20 ppm to about 75 ppm.

18. The antimicrobial lens of claim 2 wherein the lens is a silicone hydrogel and the monomer of Formula I is



19. The antimicrobial lens of claim 18 wherein silver is present at about 20 ppm to about 150 ppm and the monomer of Formula I is present at about 0.01 to about 1.5 weight percent.

20. The antimicrobial lens of claim 2 wherein the lens is etafilcon A, balafilcon, A, acquafilcon A, lenefilcon, or lotrafilcon A and the monomer of Formula I is



21. The antimicrobial lens of claim 20 wherein silver is present at about 20 ppm to about 150 ppm and the monomer of Formula I is present at about 0.01 to about 1.5 weight percent.

22. The antimicrobial lens of claim 21 wherein the lens is etafilcon A.

23. The antimicrobial lens of claim 21 wherein the lens is acquafilcon A.

24. The lens of claim 23 wherein silver is present at about 20 ppm to about 75 ppm.